Standard Operating Procedure for the Determination of Dissolved O_2 Correction Factors

LG303

Revision 01, April 2000

TABLE OF CONTENTS

Standard Operating Procedure for the Determination of Dissolved O_2 Correction Factors

1.0 DEFINITIONS

H_2O Temperature (°C)	=	T_w
Air Temperature (°F)	=	T_a
Atmospheric Pressure (mbar)	=	P_o
Corrected Pressure (mbar)	=	$P_{c(mbar)}$
Corrected Pressure (mm Hg)	=	$P_{c(mm\ Hg)}$
Correction Factor (°F)	=	C
Theoretical O_2 Saturation (mg/L)	=	S_T
Adjusted Theoretical Saturation (mg/L)	=	O_T
Measured Dissolved Oxygen (mg/L)	=	O_M
Actual Dissolved Oxygen (mg/L)	=	O_A

2.0 DETERMINE AIR TEMPERATURE CORRECTION FACTOR

2.1 Use the following equation, which was calculated with data from Standard Methods, to determine the correction factor for the ambient air temperature (or laboratory temperature for the saturated standard):

$$C = -0.0434\ T_a + 23.171$$

3.0 CORRECTED PRESSURE

3.1 Subtract the correction factor determined in the previous step, from the observed pressure to determine the corrected pressure, given as:

$$P_c\ (mbar) = P_o - C$$

3.2 Use this result and convert the units of pressure with the following expression:

$$P_c\ (mm\ Hg) = 0.750062\ P_c\ (mbar)$$

4.0 THEORETICAL O_2 SATURATION

4.1 Determine the theoretical O_2 saturation at T_w and 760 mm Hg with the following equation, which was calculated using temperature data from Standard Methods:

$$S_T = 0.0049\ T_w = -0.3661\ T_w + 14.534$$

4.2 Adjust this result using the corrected pressure in mm Hg, P_c *(mm Hg)*:

$$O_T = \frac{S_T \times P_c \ (mm\ Hg)}{760}$$

5.0 ACTUAL DISSOLVED O_2 CONCENTRATION

5.1 Determine the actual dissolved O_2 concentration:

$$O_A = \frac{(60\ O_M)}{(V_{bottle} - 0.8)}$$

6.0 STATISTICS

6.1 The relative percent deviation is given as:

$$RPD = \frac{|O_T - O_A|}{\left(\frac{O_T + O_A}{2}\right)} \times 100$$

6.2 while:

$$\%Saturation = \left(\frac{O_A}{O_T}\right) \times 100$$